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ABSTRACT

This paper details the factors contributing to the wage structure of Hispanic men and compares the wages of Black and Anglo men. The major finding is that controlling for differences in observable personal characteristics--such as education and work experience--substantially reduces the wage differences between Hispanics and Anglos. For example, among Mexicans the observed wage differential for men is about 30 percent. Yet once the differences in personal characteristics are controlled for, the differential drops to 6 percent. This remaining 6 percent differential is attributed to labor market discrimination. After controlling for differences, the differential attributable to discrimination for Puerto Rican males is 18 percent, for Black males 14 percent, and for "other Hispanic" males 12 percent. The Cuban-Anglo differential can be completely explained by differences in observable personal characteristics, especially recency of arrival in the United States and language handicaps. These factors, along with low education and discrimination, also seriously handicap Puerto Rican men. Other findings include the following: (1) Mexican and "other Hispanic" men have significantly lower wages in States where Hispanics are a large fraction of the population; and (2) minority men (except U.S. Mexican-Americans) have lower wage returns to education than Anglos. (CMG)

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A Comparative Analysis of the Wages of Hispanic, Black, and Anglo Men

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A Comparative Analysis of the Wages of Hispanic, Black, and Anglo Men

Hispanic men, like blacks, have lower average wages than white non-Hispanic men. The Hispanic/Anglo wage ratio for men in 1975 ranged from .72 for Mexicans to .89 for Cubans.[1] That Hispanics are a disadvantaged group in the U.S. labor market is widely recognized; little is known, however, about the specific sources of this disadvantage. For example, how much do lower education levels, younger average age, recency of immigration, English language problems, or residence in low-wage areas of the country contribute to the Hispanics' lower wages? How important is labor-market discrimination?

This paper analyzes the wage structure of Hispanic men to provide a detailed picture of the factors contributing to their wages. The wages of black and white non-Hispanic men are also analyzed, for purposes of comparison. We first look at the average values of various wage-related personal characteristics for each ethnic group. To find out how important these characteristics are in determining wages, we then estimate a separate wage function for each ethnic group: Mexicans, Puerto Ricans, Cubans, Central and South Americans, "other Hispanics," black non-Hispanics, and white non-Hispanics. The data are from the 1976 Survey of Income and Education. The wage samples consist of male civilian employees aged 14 and above who were not self-employed nor full-time students. These wage samples contain about 60% of the total number of males in the data set.

Because the observed wage structure is affected by the decisions men make about whether or not to participate in the wage and salary sector as

well as by the wage offers they receive, we correct for possible sample selection bias to get consistent estimates of the parameters of the wage-offer function facing each ethnic group. A group's wage-offer function shows the effect of various personal characteristics on the average wage offered by employers to members of the group, whether or not the offers are accepted and the individuals appear in the wage sample. The group's observed-wage function, on the other hand, shows the effect of these characteristics on the average wage that is actually observed in the wage sample. The average observed wage will differ from the average wage offer if inclusion in the wage sample is not random with respect to the wage offer. For example, if those who receive unusually low wage offers are less likely to accept them, the average observed wage will be higher than the average wage offer.

Examination of these parameters of the wage function reveals, among other things, to what extent English-language deficiencies reduce wages, whether black Hispanics earn less than white Hispanics, and whether minorities earn more in the public than the private sector. They also tell how rapidly immigrants' earnings rise after they come to the United States, how the returns to foreign schooling and work experience compare with the returns to schooling and work experience acquired in the United States and how these returns vary across ethnic groups.

Finally, we want to know how much the differences in average personal characteristics—education, age, recency of immigration, etc.—and in parameters of the wage function contribute to the observed wage differentials between minority men and white non-Hispanics. To answer this question, we present a detailed breakdown of the observed wage differen-

tials, showing the portions due to (1) differences in sample selection bias; (2) geographical differences in price levels; (3) differences in average personal characteristics, broken down to show education, potential work experience, nativity and date of immigration, English fluency, etc., separately; and (4) differences in parameters of the wage function due to labor-market discrimination and other omitted factors.

The next section describes the data and specification of the wage function in detail. We then present the average wage-related characteristics of the various ethnic groups. The following section discusses the estimated parameters for specific variables, their magnitudes, and intergroup variation. Next we describe the breakdowns of the minority-Anglo wage differentials for each ethnic group. Our major conclusions are summarized in the final section.

DATA AND MODEL SPECIFICATION

The Survey of Income and Education, conducted by the U.S. Bureau of the Census in the spring of 1976 on a sample of over 150,000 households in all fifty states and the District of Columbia, furnished the data for this study.[2] Detailed information on employment, sources and amounts of income, race, sex, age, ethnicity, nativity, immigration date, education, language usage, health status, and family composition are available. Ethnicity was self-identified by the response to the question, "What is _____'s origin or descent?" accompanied by a list of ethnic groups. Race was assigned by interviewer observation. The most serious omissions are measures of accumulated work experience, job training, and ability. Wage rates are not reported directly, but must be computed from reported

annual earnings, total weeks worked, and usual hours worked per week in 1975. Despite these shortcomings, the Survey of Income and Education is an attractive data set for investigating Hispanic-Anglo earnings differentials because it contains immigration and language information and because the large sample enables one to examine relatively small ethnic groups, such as Cubans, separately.

The data in the Survey of Income and Education reflect the conditions of a recession year, 1975. Since all sorts of differentials in the labor market tend to widen in recessions, our findings may not represent "normal" conditions. We minimize this potential problem by focusing on wage rates, which fluctuate less over the cycle than employment or hours, and by taking account of sample selection bias in estimating the wage functions. Therefore, intergroup variations in employment over the cycle should not affect our results.

From the Survey of Income and Education we took the records of every male aged 14 or older who identified himself as being of Hispanic origin--i.e., Mexican American, Chicano, Mexican, Mexicano, Puerto Rican, Cuban, Central or South American, and the residual category of "other Hispanic." The first four groups constitute our "Mexican" category. We also extracted random samples of households headed by white and black non-Hispanics. Our seven samples are mutually exclusive: the Hispanics may be of any race; the whites and blacks include non-Hispanics only. Non-Hispanics who are neither white nor black (e.g., Asians) are excluded from this study.

For estimating the wage function, we restricted the samples to those for whom a reasonably accurate wage rate could be obtained by dividing annual earnings by annual weeks worked times usual hours worked per week

in 1975. The wage samples were therefore composed of civilians who worked for pay in 1975; whose earnings were from wages and salaries only; who were either not enrolled in school on February 1, 1976, or had worked over 1250 hours in 1975 if they were enrolled; for whom we had complete information on the explanatory variables; and whose hourly earnings, adjusted for the cost of living, were between 10 cents and 50 dollars for Hispanics and blacks and between 10 cents and 100 dollars for white non-Hispanics. Examination of the hourly earnings distributions for each group revealed a few cases with such extremely low or high values that it seemed they must result from errors in reporting earnings or weeks or hours; because such extreme values would exert a great deal of leverage in an ordinary least squares regression, it seemed desirable to exclude them from the samples rather than to treat them as ordinary errors-in-equation.[3] Thus we excluded the self-employed, students working part-time, Armed Forces personnel, unpaid family workers and others with no reported earnings, those lacking information on such explanatory variables as language fluency and health status, and a handful of outliers on hourly earnings. The reasons for the first three exclusions are as follows: for the self-employed, computed hourly earnings are likely to be a very poor measure of the wage rate; weeks and hours worked are not available for the Armed Forces; and students often choose part-time jobs for convenience, at wages that do not reflect their human capital.

The wage samples, thus restricted, contain only about 60% of the males aged 14 or older in the data set. Moreover, inclusion in our wage sample is the consequence of several decisions by a respondent that might very well be nonrandom with respect to the stochastic error in the wage

equation, and which may therefore bias the results. He must have chosen to be a civilian wage and salary employee rather than a full-time student, a self-employed person, a nonmarket worker, a retiree, or a member of the Armed Forces. This decision was presumably the outcome of optimizing behavior with respect to the current use of his stock of human capital. Because omitted variables that affect one's productivity in the wage and salary sector probably affect one's productivity differently in the education, Armed Forces, self-employment, and nonmarket sectors, we would expect some systematic censoring of the sample to occur, with attendant bias to the estimated coefficients of the wage equation.

To see this, let the wage-offer function for individual i in group j be

$$(1) \quad \ln W_{ij} = X_{ij}\beta_j + \varepsilon_{1ij}.$$

Let the rule governing participation in the wage and salary sector be as follows: individual i in group j participates if and only if

$$(2) \quad Z_{ij}\gamma_j + \varepsilon_{2ij} > 0.$$

In these expressions, $\ln W_{ij}$ is the natural logarithm of the wage rate, X_{ij} and Z_{ij} are vectors of known individual characteristics, β_j and γ_j are vectors of unknown coefficients that are common to the members of the group, and ε_{1ij} and ε_{2ij} are random errors that reflect unknown influences on the wage rate and the participation decision, respectively. ε_{1ij} and ε_{2ij} are jointly normally distributed, with

$$E(\varepsilon_{1ij}) = E(\varepsilon_{2ij}) = 0$$

$$\text{Cov}(\varepsilon_{1ij}\varepsilon_{2i'j'}) = \begin{bmatrix} \sigma_{11j} & \sigma_{12j} \\ \sigma_{12j} & 1 \end{bmatrix} \text{ if } i = i' \text{ and } j = j',$$

$$= 0 \text{ if } i \neq i' \text{ or } j \neq j'.$$

Then, as Heckman (1979) has shown,

$$(3) \quad E(\ln W_{ij} \mid \text{in sample}) = X_{ij}\beta_j + E(\varepsilon_{1ij} \mid \text{in sample})$$

$$= X_{ij}\beta_j + \sigma_{12j}\hat{\lambda}_{ij}$$

where $\hat{\lambda}_{ij} = f(Z_{ij}\hat{\gamma}_j)/F(Z_{ij}\hat{\gamma}_j)$, in which $f(.)$ is the standard normal density function, and $F(.)$ is the standard normal distribution function. If participation in the wage and salary sector is not random, given one's observed characteristics, so that $\sigma_{12j} \neq 0$, then $E(\varepsilon_{1ij} \mid \text{in sample}) \neq 0$ and ordinary least squares estimates of β_j will be subject to a type of "omitted variable" bias.

Therefore, to get consistent estimates of β_j, we estimate a sample participation probit to obtain $\hat{\gamma}_j$, compute $\hat{\lambda}_{ij}$, and include it as an additional regressor in the wage function, which is then estimated by ordinary least squares:

$$(4) \quad \ln W_{ij} = X_{ij}\beta_j + \sigma_{12j}\hat{\lambda}_{ij} + v_{ij},$$

where $v_{ij} \sim N(0, \sum_j)$.

The variables in the reduced-form probit equation are defined in Table 1, and their mean values are given in Table 2. In addition to the variables in the wage equation, the probit includes marital status, certain determinants of the spouse's wage if married, number and ages of

family members, exogenous family income, and the maximum AFDC payment that would be available to the family if it had no other income.

The estimated probit coefficients, reported in Table 3, look reasonable. Age and health are the only consistently significant determinants of being a wage or salary earner. Education, welfare, exogenous income, marital status, and spouse's age and education also have the expected effect, either positive or negative, in all but 5 out of the 49 instances (assuming that the effect of the spouse's wage on a person's labor supply is negative).

For the wage equation itself, as indicated above, we computed the average hourly wage rate as total wage and salary earnings in 1975, divided by the product of total weeks worked and usual hours worked in those weeks. To allow for differences in wages due to price-level variation across the country, we divided each person's hourly earnings by a cost-of-living index for his place of residence.[4] The dependent variable for the estimated wage equation was the natural logarithm of "real" hourly earnings, "real" in this case meaning adjusted in that manner for the cost of living. This is equivalent to entering the natural logarithm of the cost index as an explanatory variable, and constraining its coefficient to equal one. This adjustment eliminated 7% of the original wage differential between Mexican and white non-Hispanic males, but widened the differential for Puerto Ricans, who tend to live in the high-cost Northeast.

As explanatory variables we used educational attainment, years of education obtained abroad, potential work experience (i.e., age minus preschool and school years), military experience, health status, and com-

Table 1

Definitions of Variables Used in the Analyses

Variable	Definition
WAGE (W)	Hourly wage rate, calculated as annual earnings/(weeks worked x usual hours worked per week) in 1975.
LNWAGE (lnW)	Natural logarithm of WAGE.
LNCOST (lnP)	Natural logarithm of BLS cost index for moderate family budget in SMSA or region of residence. If SMSA of residence was not in the BLS sample, another SMSA in the same state or region was used. If residence was not identified as being in an SMSA, the BLS index for nonmetropolitan areas in the region was used.
LNRWAGE ln(W/P)	LNWAGE minus LNCOST.
ED	Highest grade of school completed.
FORED	Years attended school abroad (= 0 if born in U.S. mainland).
AGE	Age, in years.
AGESQ	Square of AGE.
EXP	Potential work experience; age minus highest grade attended minus 5.
EXPSQ	Square of EXP.
USEXP	Years of potential work experience in U.S.: if born in U.S. mainland, age minus highest grade attended minus 5; if born outside U.S. mainland, estimated time in U.S. (using mid-point of immigration period) or age minus highest grade attended minus 5, whichever is smaller.
USEXPSQ	Square of USEXP.

(table continues)

Table 1 (cont.)

Definitions of Variables Used in the Analyses

Variable	Definition
FOREXP	Years of potential work experience before immigrating to U.S.: age minus highest grade attended minus 5 minus USEXP.
FOREXPSQ	Square of FOREXP.
VET	= 1 if veteran; 0 otherwise (men only).
MAR	= 1 if married, spouse present; 0 otherwise (women only).
KIDSLT6	No. of children under age 6.
KIDS611	No. of children aged 6-11.
KIDS1217	No. of children aged 12-17.
FAM1864	No. of family members aged 18-64.
FAM65	No. of family members aged 65 or more.
FBORN	= 1 if born outside U.S. mainland; 0 otherwise.
USO6	No. of years since immigrated to U.S., 1970 or after (= 0 if born in U.S. or immigrated before 1970).
US46	= 1 if immigrated to U.S. 1970-72; 0 otherwise.
US711	= 1 if immigrated to U.S. 1965-69; 0 otherwise.
US1216	= 1 if immigrated to U.S. 1960-64; 0 otherwise.
US1726	= 1 if immigrated to U.S. 1950-59; 0 otherwise.
US2799	= 1 if immigrated to U.S. before 1950; 0 otherwise.
ENGNVG	= 1 if does not speak and understand English very well; 0 otherwise.
HEALTH	= 1 if health limits ability to work; 0 otherwise.

(table continues)

Table 1 (cont.)

Definitions of Variables Used in the Analyses

Variable	Definition
GOVT	= 1 if government employee; 0 otherwise.
NONWHT	= 1 if race is nonwhite; 0 otherwise.
PROPHIS	percentage Hispanic of population in state of residence.
$\hat{\lambda}$	Inverse of Mill's ratio, predicted from reduced-form probit equation for being in wage sample.
INCOME	Exogenous family income: dividends, interest, rents, pensions, child support, and other non-earnings-conditioned transfers; other family members' unemployment insurance, workmen's compensation, and veterans' benefits; earnings of family members other than self and spouse. Measured in $000's.
WELF	Maximum AFDC payment available to family if no other income (depends on state of residence, whether a male head is present, and number of children under age 18). Measured in $000's.
SPED	Spouse's highest grade of school completed (= 0 if MAR = 0).
SPAGE	Spouse's age, in years (= 0 if MAR = 0).
SPAGESQ	Square of SPAGE (= 0 if MAR = 0).
SPFBORN	= 1 if spouse born outside U.S. mainland; 0 otherwise (= 0 if MAR = 0).
INSAMPLE	= 1 if in sample for wage equation: employed in 1975, civilian, no self-employment income, not enrolled in school (or worked over 1250 hours if enrolled), $.10 < W/P < $50 for Hispanics, $.10 < W/P < $100 for white non-Hispanics; = 0 if not in wage sample.

Table 2

Means of Variables: Men in Probit Samples

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
INSAMPLE	.563	.622	.598	.602	.719	.566	.545
ED (grade)	11.75	9.34	9.31	10.72	11.57	10 30	9.88
FORED x FBORN (educ. years outside U.S.)	.177	1.09	4.39	7.89	8.86	.964	.138
AGE (years)	40.61	33.45	34.66	40.46	35.25	38.11	37.12
AGESQ	2008.5	1371.55	1426.65	1928.08	1392.82	1807.85	1723.9
FBORN	.032	.246	.707	.932	.930	.126	.015
US06 x FBORN (years)	.010	.241	.469	1.02	1.54	.122	.029
US711 x FBORN	.002	.037	.086	.278	.228	.031	.004
US1216 x FBORN	.001	.029	.086	.289	.145	.024	.002
US1726 x FBORN	.009	.048	.290	.098	.097	.011	.001
US2799 x FBORN	.018	.057	.110	.041	.035	.030	.001
ENGNVG	.009	.288	.411	.530	.487	.212	.002
NONWHT	0	.022	.114	.041	.154	.047	1.0
HEALTH	.154	.130	.173	.124	.075	.163	.191
VET	.394	.246	.190	.083	.066	.317	.273

(table continues)

Table 2 (cont.)

Means of Variables: Men in Probit Samples

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
PROPHIS (%)	3.38	15.45	5.42	6.18	6.66	18.51	3.26
MAR	.649	.582	.638	.658	.614	.590	.477
KIDSLT6 (number)	.215	.466	.385	.218	.425	.242	.235
KIDS611 (number)	.312	.601	.510	.338	.390	.458	.457
KIDS1217 (number)	.568	.937	.794	.695	.368	.823	.859
FAM1864 (number)	2.06	2.33	2.13	2.28	2.06	2.24	2.25
FAM65 (number)	.261	.118	.101	.274	.088	.232	.225
INCOME ($000's)	5.840	4.317	2.963	4.970	2.992	4.921	4.533
WELF ($000's)	.093	.107	.172	.038	.133	.064	.095
SPED x MAR (grade)	7.76	5.31	5.85	7.00	6.77	6.30	5.17
SPAGE x MAR (years)	28.33	21.10	22.88	27.45	20.94	24.52	20.16
SPAGESQ x MAR	1395.6	870.90	922.59	1262.43	768.30	1149.13	957.11
SPFBORN x MAR	.031	.131	.450	.568	.474	.070	.010

Note: See Table 1 for definitions of variables. Data base is 1976 SIE. Unless otherwise indicated, means reflect fractions.

Table 3

Estimated Coefficients of Reduced-Form Probit Equations for the Probability of a Man's Being in the Wage Earner Sample

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
Constant	-2.66*	-2.84*	-3.02*	-3.27*	-3.10	-3.00*	-3.89*
	(.201)	(.267)	(.724)	(1.20)	(1.61)	(.482)	(.210)
ED	.023*	-.020	.020	.066	-.024	.012	.027
	(.0078)	(.011)	(.030)	(.043)	(.055)	(.020)	(.0085)
FORED x FBORN	.018	.029	.021	-.042	.0083	-.015	.010
	(.027)	(.018)	(.025)	(.036)	(.046)	(.036)	(.053)
AGE	.146*	.188*	.157*	.143*	.257*	.179*	.204*
	(.010)	(.014)	(.038)	(.050)	(.072)	(.025)	(.010)
AGESQ	-.0017*	-.0021*	-.0016*	-.0014*	-.0029*	-.0020*	-.0022*
	(.0001)	(.0002)	(.0005)	(.0005)	(.0009)	(.0003)	(.0001)
FBORN	-1.85*	-.431	-.562	-.556	-1.82*	.022	-1.14
	(.797)	(.226)	(.453)	(.758)	(.860)	(1.02)	(.839)
US06 x FBORN	.497*	.150*	.187*	.122	.215*	-.027	.245
	(.216)	(.054)	(.093)	(.124)	(.091)	(.210)	(.155)
US711 x FBORN	2.07*	.692*	.712	.699	.690	.013	1.10
	(.886)	(.257)	(.437)	(.624)	(.460)	(.973)	(.752)
US1216 x FBORN	1.42	.293	.902*	.778	.505	-.678	.815
	(.942)	(.263)	(.438)	(.615)	(.497)	(.977)	(.884)
US1726 x FBORN	1.86*	.354	.930*	1.64*	1.28*	-.702	1.31
	(.782)	(.239)	(.409)	(.739)	(.627)	(1.03)	(1.03)

(table continues)

Table 3 (cont.)

Estimated Coefficients of Reduced-Form Probit Equations for the Probability of a Man's Being in the Wage Earner Sample

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
US2799 x FBORN	1.77*	.361	.655	1.19	2.39*	-.128	-.140
	(.776)	(.249)	(.459)	(.803)	(1.02)	(1.02)	(1.09)
ENGNVG	-.066	.069	.330	.037	-.083	-.036	-.028
	(.282)	(.089)	(.197)	(.262)	(.280)	(.157)	(.544)
NONWHT	—	-.120	-.590*	.637	-.321	.435	—
		(.182)	(.220)	(.520)	(.329)	(.272)	
HEALTH	-.505*	-.760*	-1.51*	-1.15*	-.962*	-.883*	-.916*
	(.057)	(.086)	(.200)	(.230)	(.455)	(.142)	(.063)
VET	.128*	.077	.453*	.447	.914	.248*	.111
	(.046)	(.075)	(.198)	(.441)	(.733)	(.128)	(.060)
PROPHIS	.0001	-.0061*	-.020	-.0070	-.0009	-.0038	.0047
	(.0036)	(.0029)	(.017)	(.028)	(.020)	(.0038)	(.0046)
MAR	2.22*	2.27*	1.81	1.46	.798	1.01	2.32*
	(.310)	(.391)	(1.03)	(1.43)	(2.16)	(.767)	(.377)
KIDSLT6	-.086*	.108*	.373*	-.118	.352	.197	-.060
	(.044)	(.046)	(.125)	(.200)	(.233)	(.110)	(.049)
KIDS611	-.067*	-.035	-.123	-.129	-.219	.013	.014
	(.033)	(.036)	(.090)	(.158)	(.222)	(.073)	(.034)
KIDS1217	-.156*	-.109*	-.111	-.071	-.077	-.153*	-.161*
	(.026)	(.028)	(.083)	(.114)	(.221)	(.050)	(.026)

(table continues)

Table 3 (cont.)

Estimated Coefficients of Reduced-Form Probit Equations for the Probability of a Man's Being in the Wage Earner Sample

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
FAM1864	.110*	.099*	.045	.149	.276	.100	.118*
	(.027)	(.031)	(.109)	(.137)	(.337)	(.058)	(.025)
FAM65	-.061	-.170	-.830*	-.267	-.807	.045	-.126*
	(.056)	(.102)	(.312)	(.242)	(.577)	(.143)	(.061)
INCOME ($000's)	-.021*	-.023*	.0018	-.0080	-.067*	-.021*	-.023*
	(.0030)	(.0059)	(.017)	(.020)	(.032)	(.0092)	(.0045)
WELF ($000's)	.384*	-.318	-.553	-.857	.706	-.752	-.017
	(.156)	(.202)	(.437)	(.890)	(.906)	(.428)	(.188)
SPED x MAR	-.040*	-.040*	-.013	-.026	-.0002	-.0048	-.037*
	(.011)	(.013)	(.031)	(.042)	(.054)	(.026)	(.013)
SPAGE x MAR	-.076*	-.075*	-.069	-.047	-.110	-.037	-.079*
	(.015)	(.021)	(.056)	(.071)	(.125)	(.038)	(.017)
SPAGESQ x MAR	.0007*	.0007*	.0008*	.0004	.0018	.0003	.0008*
	(.0002)	(.0003)	(.0007)	(.0008)	(.0017)	(.0004)	(.0002)
SPFBORN x MAR	-.260*	-.157	-.552*	.088	.262	.362	-.580*
	(.131)	(.102)	(.221)	(.381)	(.428)	(.246)	(.238)
No. of Observations	5,168	2,859	525	266	228	923	4,050
Max log likelihood	-2765.33	-1324.19	-222.47	-130.77	-90.92	-424.21	-1863.22

Note: Dependent variable is INSAMPLE for wage equation. Standard errors are in parentheses. Variables are defined in Table 1.

*Statistically significant at the 5% level.

mand of English. Because much of a person's human capital is country-specific, we also controlled for nativity and length of time in the United States.

In addition to the human capital variables, we included variables for government employment and for race. If, as Sharon Smith (1977) has found, government employees earn more than private-sector workers with the same human capital, and if one ethnic group has greater access to government jobs than another, this will affect the relative average wage. We would like to be able to distinguish this effect. Since we know blacks suffer from discrimination, and some Hispanics are black, we would like to know how much of the Hispanics' lower average wage is due to race, and how much discrimination affects Hispanics who are white. We did not control for urban vs. rural location because this information was suppressed in a great many cases by Census procedures to preserve confidentiality. Insofar as location is known, the effect of urban residence, as well as region, on the wage rate is captured by the cost-of-living adjustment. The explanatory variables are defined in Table 1, and their mean values for the wage earners in each ethnic group are in Table 4.

AVERAGE WAGE-RELATED CHARACTERISTICS

The mean values of the variables in Table 4 reveal a number of ways in which Hispanics are disadvantaged by possessing less "human capital" on average than white non-Hispanic men. Average education levels are around 12.5 years for white non-Hispanic male wage earners and 10.5 years for blacks, yet are less than tenth grade for Mexicans and Puerto Ricans.

Table 4

Means of Variables for Men in the Sample of Wage Earners

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
WAGE (W) (dollars/hr)	5.97	4.31	4.52	5.33	4.94	5.20	4.65
LNWAGE (lnW)	1.607	1.303	1.389	1.515	1.397	1.466	1.374
LNCOST (lnP)	-.025	-.068	.074	-.015	.051	-.043	-.028
LNRWAGE (lnW/P)	1.632	1.371	1.316	1.530	1.346	1.509	1.402
ED (grade)	12.41	9.44	9.75	11.32	11.79	11.04	10.54
EXP (years)	20.77	19.51	20.45	24.12	19.05	21.33	22.96
EXPSQ	669.08	597.75	602.54	788.37	487.16	693.76	788.59
VET	.486	.304	.255	.112	.085	.427	.374
FBORN	.028	.269	.793	.950	.921	.119	.015
FBORN x FORED (educ. years outside U.S.)	.192	1.31	5.25	8.64	9.23	1.04	.149
FBORN x US46	.0024	.040	.073	.125	.262	.019	.0059
FBORN x US711	.0031	.048	.086	.250	.220	.040	.0041
FBORN x US1216	.0010	.029	.102	.331	.134	.023	.0018
FBORN x US1726	.010	.059	.350	.150	.116	.010	.0014

(table continues)

Table 4 (cont.)

Means of Variables for Men in the Sample of Wage Earners

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
FBORN x US2799	.010	.045	.115	.056	.037	.015	.0005
ENGNVG	.0076	.321	.446	.538	.482	.186	.0018
HEALTH	.101	.092	.076	.056	.055	.090	.120
GOVT	.169	.177	.150	.081	.104	.226	.240
NONWHT	0	.022	.086	.056	.116	.052	1.0
$\hat{\lambda}$	.536	.416	.395	.461	.309	.454	.472
Selection Bias ($\hat{\sigma}_{12}\hat{\lambda}$)	-.198	-.163	-.084	-.134	.015	-.113	-.202
ED x FBORN (grade)	.329	1.93	7.38	10.73	10.80	1.19	.174
USEXP (years)	20.56	16.74	15.50	12.19	9.72	20.07	22.79
USEXP x FBORN (years)	.574	3.64	12.02	11.04	8.20	1.51	.125
FOREXP x FBORN (years)	.208	2.77	4.94	11.92	9.33	1.25	.168
USEXPSQ	656.49	474.24	365.76	244.24	169.35	641.10	782.67
USEXPSQ x FBORN	17.79	90.80	264.10	196.42	126.95	32.50	1.63
FOREXPSQ x FBORN	4.18	60.71	91.38	293.52	191.01	27.95	3.56
PROPHIS (%)	3.40	14.89	5.22	6.12	6.68	17.11	3.41

Note: Variables are defined in Table 1. Unless otherwise indicated, means reflect fractions.

The other three Hispanic groups average between 11 and 12 grades of school. The Mexicans and Puerto Ricans are younger (see EXP) than the other groups on average, and the Cubans are even older than white non-Hispanics. Almost all of the Cubans and Central and South Americans are foreign-born, and members of the latter group arrived in the United States even more recently than the Cubans. Eighty percent of the Puerto Ricans were born on the island. Almost 75% of the Mexicans, on the other hand, were born in the United States. The "other Hispanics" are overwhelmingly (90%) from the second or later generations in the United States. This group includes persons of mixed Hispanic ancestry as well as those who did not identify with any of the listed Hispanic groups.

Not surprisingly, the percentages of each group who are fluent in English (the complement of ENGNVG) and who have been in the Armed Forces reflect the percentages born in the United States. Government employment also tends to reflect birthplace, except that Mexican and Puerto Rican men are about as likely as white non-Hispanics to hold government jobs, while blacks and "other Hispanics" are much more likely to do so.

PARAMETERS OF THE WAGE FUNCTIONS

The estimated wage equations, corrected for selectivity bias, are reported in Table 5. The coefficient of $\hat{\lambda}$, which represents the covariance between the errors in the sample participation probit and the wage equation, is negative for all groups except the Central and South Americans. It is significantly negative for the largest samples of men--whites, blacks, Mexicans, and "other Hispanics." Apparently people in these ethnic groups who have unusually high market wage offers, given

Table 5

Coefficients of Wage Equations for Men, Corrected for Sample Selection Bias:
Effect of Variables on Average Wage Offer

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
Intercept	.618*	.764*	.837*	1.035*	.290	.893*	.850*
	(.077)	(.091)	(.227)	(.462)	(.402)	(.175)	(.090)
ED	.061*	.054*	.036*	.035	.050*	.034*	.049*
	(.0041)	(.0053)	(.013)	(.019)	(.022)	(.010)	(.0046)
EXP	.041*	.024*	.038*	.040*	.039	.029*	.015*
	(.0033)	(.0041)	(.0082)	(.015)	(.020)	(.0078)	(.0038)
EXPSQ	-.0006*	-.0003*	-.0006*	-.0007*	-.0006	-.0004*	-.0002*
	(.0001)	(.0001)	(.0002)	(.0003)	(.0004)	(.0001)	(.0001)
VET	-.0080	.029	-.0015	.210	.219	.044	.022
	(.024)	(.034)	(.068)	(.144)	(.214)	(.060)	(.026)
FBORN	-.195	-.258*	-.157	-.167	-.411	.277	.415
	(.355)	(.082)	(.152)	(.300)	(.322)	(.324)	(.413)
FBORN x FORED	.0006	-.0056	-.0048	-.0067	.019	-.0092	-.036
	(.014)	(.0077)	(.0086)	(.016)	(.018)	(.022)	(.028)
FBORN x US46	.036	.229*	.025	-.031	.245	-.307	-.184
	(.394)	(.087)	(.141)	(.227)	(.161)	(.289)	(.327)
FBORN x US711	.088	.129	.086	-.0030	.244	-.364	-.124
	(.379)	(.086)	(.138)	(.220)	(.156)	(.260)	(.344)
FBORN x US1216	.104	.191	.044	.147	.275	.125	.231
	(.468)	(.098)	(.135)	(.226)	(.190)	(.281)	(.395)

(table continues)

Table 5 (cont.)

Coefficients of Wage Equations for Men, Corrected for Sample Selection Bias:
Effect of Variables on Average Wage Offer

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
FBORN x US1726	.029 (.348)	.284* (.085)	.027 (.125)	.063 (.268)	.479* (.214)	-.191 (.343)	.039 (.427)
FBORN x US2799	.186 (.350)	.220* (.097)	.160 (.152)	.108 (.292)	.313 (.362)	-.394 (.337)	-.187 (.595)
ENGNVG	-.068 (.153)	-.048 (.039)	-.203* (.072)	-.159 (.098)	-.097 (.121)	-.184* (.080)	.487 (.282)
HEALTH	-.011 (.039)	-.017 (.051)	.214 (.133)	.124 (.216)	.152 (.238)	.011 (.105)	.114* (.045)
GOVT	-.014 (.027)	-.033 (.033)	-.023 (.074)	.011 (.143)	.121 (.164)	.064 (.060)	.070* (.025)
NONWHT	—	-.089 (.089)	.120 (.095)	-.153 (.183)	.011 (.151)	-.064 (.114)	—
$\hat{\lambda}$	-.369* (.058)	-.390* (.063)	-.212 (.120)	-.291 (.247)	.050 (.254)	-.250* (.118)	-.428* (.057)
N	2,911	1,778	314	160	164	522	2,209
R^2	.261	.227	.262	.320	.248	.210	.228
$(\hat{\sigma}_{11})^{1/2}$ (Corrected)	.591	.579	.448	.494	.582	.561	.575

Note: Dependent variable is LNRWAGE. Corrected standard errors are in parentheses. Variables are defined in Table 1.

*Statistically significant at the 5% level.

their measured characteristics, have even higher productivity in other sectors and so are less likely to be in the wage sample.[5]

Our significantly negative estimates of σ_{12} (the coefficient of λ) are not simply a result of the broad age range (everyone over age 13) included in the samples we analyzed. When we estimated the same model for Mexican men aged 25 through 59, the coefficient of $\hat{\lambda}$ was also significantly negative, even though the sample participation rate was much higher (81% rather than 62%). This illustrates the point that there is no necessary connection between the sample participation rate and the correlation between the stochastic terms in the wage and the participation equations. A 50% sample may be randomly selected, while a 90% sample may systematically exclude the highest 10% of wage offers. Thus, choosing an age group with a high wage and salary-sector participation rate would not eliminate the possibility of selectivity bias (though it might reduce its quantitative impact on the estimated parameters).

When we examine the estimates of the coefficients of the wage-offer functions in Table 5, we find that race (NONWHT) has no significant impact on the wages of Hispanics; black Hispanics suffer from one handicap, not two. The sign on the NONWHT dummy variable is actually positive for Puerto Rican men. Poor health does not depress the wage rate a man is offered; the sign on the health disability dummy is usually positive, significantly so for black men. Black men get 7% more in the public (GOVT) than in the private sector, but public sector wages are not significantly different from wages in the private sector for white or Hispanic men.

The wages of successive cohorts of immigrants, compared with U.S.-born members of their ethnic group, can be plotted using the esti-

mated coefficients of the wage equation. FBORN plus FBORN x FORED tells how a newly arrived immigrant with a given level of schooling fares, compared with the U.S.-born members of his ethnic group who have the same education, age, etc. The dummy variables US46, US711, US1216, US1726, and US2799, when added to (FBORN + FBORN x FORED), tell how immigrants of these cohorts fare, compared with the U.S. natives. We can use as an example an immigrant who has eight years of foreign schooling, which is about average.

White non-Hispanic male immigrants do not catch up with native whites until they have been here at least 27 years. Mexican immigrants with less than a sixth-grade education match U.S.-born Mexicans when they have been here 17 to 26 years, but the cohort that arrived before 1950 earns less than U.S. natives. Island-born Puerto Rican men apparently never catch up, unless they come with no education. Neither do Cubans. The unusual nature of the wave of Cuban political refugees who came in the early 1960s is reflected in their average wage rate, which is higher than that of the Cuban men who arrived before or after them.

Central and South American immigrants with ten years of schooling overtake the few who are U.S. natives in 4 to 6 years. Those who arrive with less schooling take longer to catch up. Blacks and "other Hispanics" show an erratic pattern: new arrivals and those who have been here 12 to 26 years earn more than U.S. natives, but this is not true of those who have been here 4 to 11 years or more than 26 years.

The estimated wage loss from a poor command of English varies across groups, from an insignificant 5% for Mexican men to 18 to 20% for "other Hispanics" and Puerto Ricans. Blacks with poor English apparently earn

more than other blacks, but there are so few (four) of them that this may be a coincidence.

All Hispanic groups have lower returns to education than Anglos, ranging from 3.4% per grade for "other Hispanics" to 5.4% for Mexicans. Anglo men earn 6.1% more for each additional grade of school completed. The coefficient of FORED is always virtually zero, indicating that there is no appreciable difference between U.S. and foreign schooling in enhancing earnings capacity.

The initial returns to (potential) work experience are about the same for Puerto Rican, Cuban, Central and South American, and white non-Hispanic men. Mexicans, "other Hispanics," and blacks have flatter experience-wage profiles than the others. For each group we can find the value of EXP that corresponds to the maximum wage on the experience-wage profile. Let the coefficient of EXP be β_1 and the coefficient of EXPSQ be β_2. Then $\partial \ln W/\partial EXP = \beta_1 + 2\beta_2 EXP = 0$ at the maximum point, and $EXP = -\beta_1/2\beta_2$ gives the value of EXP for which the wage is highest. For white non-Hispanics, wages peak 36 years after leaving school; for Mexicans, after 46 years; for blacks and "other Hispanics," after 40 years; for Puerto Ricans, Cubans, and Central and South Americans, after 30 to 32 years. Veterans do not earn significantly more than nonveterans in any ethnic group, which suggests that time spent in the Armed Forces is no more and no less valuable than other types of work experience.

The coefficients of experience and education merit further investigation. Our estimated coefficients of EXP and EXPSQ measure an average of the returns to U.S. work experience for the native-born and the returns to foreign and U.S. work experience for immigrants. The coefficient of

ED averages the return to U.S. schooling across U.S.-born and foreign-born individuals. Chiswick (1978) has found that immigrants have a lower estimated return to education than U.S. natives, and speculates that this is due to a weaker correlation among immigrants between schooling and the omitted variable, ability. We would therefore expect ethnic groups with larger percentages of the foreign-born to have smaller coefficients on EXP and ED.

To disentangle these effects, we estimate another set of wage equations for men. These equations include an interaction term, ED x FBORN, and separate variables measuring potential work experience in the United States (USEXP) and potential work experience abroad (FOREXP), along with quadratic and interaction terms: USEXPSQ, FOREXPSQ, USEXP x FBORN, and USEXPSQ x FBORN.[6] We also include as a variable the percentage Hispanic in the population in the state of residence, to see whether there is any evidence that the wages of Hispanics are depressed by "crowding" in labor markets with many Hispanics. The coefficients, corrected for selectivity bias, are reported in Table 6. (The variable definitions and their mean values are in Tables 1 and 4.)

From the signs of the coefficients, it appears that, except for Cubans and "other Hispanics," the foreign-born have lower returns to their U.S. schooling than the native-born members of their ethnic group. (The return to U.S. schooling for the foreign-born is the sum of the coefficients of ED and ED x FBORN.) However, except for Mexican men, the differences are not precisely enough measured to be sure of the signs. U.S.-born Mexican men have as high a return to schooling as white non-Hispanics, about 6%, and Puerto Rican men born on the mainland get

Table 6

Coefficients of Wage Equations for Men, Including Interaction Terms, Corrected for Sample Selection Bias: Effect of Variables on Average Wage Offer

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
Intercept	.622*	.721*	.619	1.320	-1.321	.992*	.854*
	(.078)	(.095)	(.358)	(.944)	(1.021)	(.173)	(.091)
ED	.061*	.062*	.049	-.025	.119	.032*	.050*
	(.0042)	(.0060)	(.026)	(.073)	(.068)	(.010)	(.0046)
ED x FBORN	-.0094	-.026*	-.019	.067	-.069	.015	-.029
	(.022)	(.0093)	(.028)	(.076)	(.070)	(.034)	(.042)
FORED x FBORN	.0048	-.0025	-.0028	-.0088	.0083	-.012	-.017
	(.014)	(.0078)	(.0081)	(.016)	(.016)	(.028)	(.041)
FBORN	.019	.185	.298	-.548	1.639	-.297	.335
	(.343)	(.125)	(.369)	(.907)	(1.061)	(.393)	(.434)
ENGNVG	-.058	-.040	-.179*	-.137	-.116	-.135	.443
	(.174)	(.039)	(.072)	(.096)	(.113)	(.081)	(.277)
USEXP	.040*	.024*	.047*	.098*	.122*	.030*	.015*
	(.0033)	(.0041)	(.014)	(.045)	(.049)	(.0076)	(.0038)
USEXP x FBORN	-.0012	.013*	-.019	-.050	-.065	.023	.042
	(.018)	(.0064)	(.016)	(.046)	(.051)	(.027)	(.056)
FOREXP x FBORN	.016	-.0021	-.0034	.014	-.0002	.027	-.0014
	(.017)	(.0055)	(.0097)	(.011)	(.017)	(.019)	(.025)
USEXPSQ	-.0006*	-.0002*	-.0007*	-.0017*	-.0019	-.0004*	-.0002*
	(.0001)	(.0001)	(.0003)	(.0009)	(.0013)	(.0001)	(.0001)

(table continues)

Table 6 (cont.)

Coefficients of Wage Equations for Men, Including Interaction Terms, Corrected for Sample Selection Bias: Effect of Variables on Average Wage Offer

Variable	White Non-Hispanics	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
USEXPSQ x FBORN	-.0000 (.0004)	-.0004* (.0001)	.0003 (.0004)	.0007 (.0009)	.0007 (.0013)	-.0007 (.0006)	-.0013 (.0022)
FOREXPSQ x FBORN	-.0004 (.0005)	.0001 (.0001)	.0001 (.0003)	-.0003 (.0003)	.0002 (.0005)	-.0005 (.0004)	.0002 (.0007)
VET	-.0061 (.025)	.015 (.034)	.0003 (.067)	.205 (.149)	-.086 (.240)	.033 (.059)	.022 (.026)
HEALTH	-.0079 (.039)	-.020 (.051)	.187 (.134)	.101 (.197)	.236 (.237)	-.043 (.104)	.117* (.045)
GOVT	-.041 (.027)	-.032 (.033)	-.019 (.074)	-.0075 (.142)	.087 (.157)	.086 (.060)	.070* (.025)
NONWHT	—	-.104 (.091)	.109 (.096)	-.126 (.175)	.011 (.147)	-.130 (.113)	—
PROPHIS	.0021 (.0020)	-.0039* (.0013)	-.0079 (.0068)	.016 (.012)	.0032 (.0084)	-.0060* (.0017)	-.0011 (.0022)
$\hat{\lambda}$	-.378* (.058)	-.394* (.057)	-.195 (.117)	-.253 (.203)	-.064 (.215)	-.194 (.114)	-.432* (.058)
N	2,911	1,778	314	160	164	522	2,209
R^2	.261	.236	.256	.338	.293	.216	.228
$(\hat{\sigma}_{11})^{1/2}$ (Corrected)	.594	.577	.447	.480	.565	.549	.577

Note: Dependent variable is LNRWAGE. Corrected standard errors are in parentheses. Variables are defined in Table 1.

*Statistically significant at the 5% level.

the same return as U.S.-born blacks, about 5%. Those born in Mexico have a 3.6% return per grade of U.S. schooling, and those born in Puerto Rico have a 3.0% return, while foreign-born white non-Hispanics have 5.2% and foreign-born blacks have 2.0%. For Central and South Americans, the return to U.S. schooling is 5% for those born abroad and 12% for the very few born in the United States. The latter estimate is not at all precise, however.

Foreign-born Cubans seem to have a higher rate of return to U.S. schooling (4.1%) than those born in the United States. The latter group's estimated coefficient on ED is negative, but there are only eight of them in the sample, so this may be a coincidence. "Other Hispanics" also have a higher rate of return to U.S. schooling if they were born abroad—4.8% as opposed to 3.2% for those who were born in the United States.

The returns to foreign work experience are much smaller than the returns to work experience in the United States. In fact, Mexican, Puerto Rican, Central and South American, and black immigrants gain virtually nothing in wage rates from prior work experience. In this sense an immigrant in one of these groups, no matter how old, resembles a new entrant to the U.S. labor force who has just finished school. On the other hand, Cuban, "other Hispanic," and white non-Hispanic immigrants do start out in the United States with higher wages the older they are on arrival. Their foreign work experience is worth only 1 or 2% per year, however—much less than experience in the United States.

There is also a difference between immigrants and U.S. natives in returns to work experience acquired in the United States. Mexican,

"other Hispanic," and black immigrants have higher initial returns to U.S. work experience than their native-born counterparts. Their experience-wage profiles also peak much more quickly, as shown in Table 7. This indicates a relatively brief, intense period of investment in human capital after entering the U.S. labor force, as we might expect of adult immigrants adapting to a new country. However, Puerto Rican, Cuban, and Central and South American immigrants have lower initial returns to U.S. work experience than those born on the mainland United States. The Puerto Rican migrants' investment period lasts as long as that of mainland natives, but the Cuban and Central and South American immigrants' investment period is shorter.

Earlier, we presented some estimates of how long it takes before immigrants' wages match the wages of native-born members of their ethnic group of the same age, education, and other personal characteristics. These estimates were derived from the wage equations that included dummy variables for the year of immigration. We can obtain another set of estimates from the wage equations that include USEXP and FOREXP as continuous variables. The answer depends on the amount and location of the immigrant's education and his age when he arrived in the United States. For specified values of these variables, we use the coefficient estimates to derive the appropriate expressions for the wages of a U.S. native and an immigrant who are alike in other respects; set these expressions equal to one another; and solve for the value of the immigrant's USEXP that satisfies the equation. (Note that, for people of the same age and education, the U.S. native's USEXP is equal to the immigrant's USEXP plus his FOREXP.)

Table 7

Value (in Years) of USEXP at Peak of the U.S. Experience-Wage Offer Profile: Native-Born and Foreign-Born Men

Ethnic Group	U.S. Natives	Foreign-Born
White Non-Hispanics	35.7	32.7
Mexicans	51.3	31.1
Puerto Ricans	32.3	33.5
Cubans	28.6	24.9
Central & South Americans	31.4	23.1
Other Hispanics	38.2	25.3
Black Non-Hispanics	40.4	19.0

Note: Value of USEXP derived from estimated wage equations in Table 6 by setting ∂LNRWAGE/∂USEXP = 0 and solving for USEXP.

If we compare an immigrant who arrives at age 20 having an eighth-grade education (i.e., FORED = 8 and FOREXP = 7) with a U.S. native having an eighth-grade education, the "catch-up" period is 4 years for blacks, 18 for "other Hispanics," 34 for whites, 42 for Puerto Ricans, and 51 for Cubans. Mexicans never catch up. Central and South American immigrants start out earning more than the native-born, but the gap narrows the longer they stay. These results are reasonably consistent with our earlier estimates.

Coefficients in Table 6 for PROPHIS tell us that in states where Hispanics constitute larger fractions of the population, white and Cuban men earn at least as much as they earn elsewhere; but Mexican, Puerto Rican, and "other Hispanic" men have lower wages than elsewhere. Moreover, the negative effect is significant for Mexicans and "other Hispanics." This may be evidence that discrimination affects Hispanics more when they are a large proportion of the labor force, as in the Southwest. It may also represent a "compensating differential," which could arise if Mexicans and "other Hispanics" prefer to live and work where there are many other Hispanics, regardless of lower wages.

DECOMPOSITION OF WAGE DIFFERENTIALS

We can use the estimated wage equations to sort out how much of the observed minority-Anglo wage differential is due to differences in average wage offers, and how much is due to differences in selection bias of the type discussed at the beginning of this paper. Further, we can break down the wage-offer differential into the parts due to differences in average personal characteristics and in parameters. The part due to differences in parameters is often attributed to discrimination.

Define $\overline{X}_j = \sum_{i=1}^{n_j} X_{ij}/n_j$, $\overline{\lambda}_j = \sum_{i=1}^{n_j} \hat{\lambda}_{ij}/n_j$, and $\overline{\ln W}_j = \sum_{i=1}^{n_j} (\ln W_{ij})/n_j = \ln \tilde{W}_j$, where n_j is the number of persons with observed wages in group j and $\tilde{W}_j$ is the geometric mean of the observed wage rate for group j. (X_{ij}, λ_{ij}, and $\ln W_{ij}$ are defined above.)

Then $\overline{\ln W}_j = \overline{X}_j \beta_j + \sigma_{12j}\overline{\lambda}_j$,

and

$$(5) \quad \overline{\ln W}_H - \overline{\ln W}_L = (\overline{X}_H \beta_H - \overline{X}_L \beta_L) + (\sigma_{12H}\overline{\lambda}_H - \sigma_{12L}\overline{\lambda}_L),$$

where the subscript H refers to the high-wage group, and the subscript L refers to the low-wage group. This shows that the observed wage differential, $\overline{\ln W}_H - \overline{\ln W}_L$, equals the difference of mean wage offers, $\overline{X}_H \beta_H - \overline{X}_L \beta_L$, plus the difference in average selectivity bias, $\sigma_{12H}\overline{\lambda}_H - \sigma_{12L}\overline{\lambda}_L$ or $E(\varepsilon_{1H} \mid \text{in observed sample}) - E(\varepsilon_{1L} \mid \text{in observed sample})$.

We can proceed to decompose the offered-wage differential in the spirit of Oaxaca (1973), giving:

$$(6) \quad \overline{\ln W}_H - \overline{\ln W}_L = (\overline{X}_H - \overline{X}_L)\,[D\beta_H + (I - D)\beta_L] + [\overline{X}_H\,(I - D) + \overline{X}_L D]\,(\beta_H - \beta_L) + (\sigma_{12H}\overline{\lambda}_H - \sigma_{12L}\overline{\lambda}_L),$$

where I is the identity matrix and D is a diagonal matrix of weights.

Since $\overline{\ln W}_H - \overline{\ln W}_L = \ln(\tilde{W}_H/\tilde{W}_L) = (\tilde{W}_H - \tilde{W}_L)/\tilde{W}_H$, equation (6) decomposes the percentage difference between the geometric means of the observed wage rates for the two groups into a part due to selectivity bias, a part attributable to differences between the groups' average values of each

characteristic, and a part attributable to differences between the parameters of the wage-offer function. The first term on the right-hand side of Eq. (6) can be interpreted as the wage difference that would exist in the absence of discrimination, if both groups had the same wage-offer function. The second term is then an estimate of the wage-offer difference due to discrimination.

We will in general get different estimates of discrimination depending upon the choice of the matrix D of weights. This choice amounts to an assumption about what the wage-offer function would be in a nondiscriminatory world. For example, setting D = I (a procedure followed by many analysts of earnings differentials) assumes that the majority group's wage-offer function would prevail; whereas D = 0 assumes that the minority group's wage-offer function would apply to everyone, in the absence of discrimination. Neither assumption seems warranted, since employers' preferences for the majority and their distaste for the minority probably distort both groups' wages. Having no way of knowing the true weights, we choose D = (1/2)I. This assumes that the no-discrimination wage-offer parameters would lie halfway between the ones currently estimated for the majority and minority groups. To show how sensitive the estimates of discrimination are to the choice of weights, in Table 8 we report these estimates for D = I and D = 0, as well as for D = (1/2)I. In addition, we show in Table 8 the observed wage differential and the estimated wage-offer differential between white non-Hispanics and each minority group.

Table 8 shows that the difference in average wage offers between Hispanic and white non-Hispanic men is always larger than the observed wage differential. For blacks, the wage-offer differential is the same

Table 8

Wage Differences between White Non-Hispanic and Minority Men, and Estimated Effect of Discrimination

Ethnic Group	(1) Observed Wage Difference[a]	(2) Wage Difference, Corrected for Selection Bias[b]	(3) Wage Difference due to Difference in Parameters[c] (D = I)[d]	(4) (D = 0)[e]	(5) (D = (1/2)I)[f]
Mexicans	.304	.339	.051	.076	.064
Puerto Ricans	.218	.332	.177	.177	.177
Cubans	.092	.156	.024	-.147	-.062
Central & South Americans	.210	.423	.350	.380	.365
Other Hispanics	.141	.225	.106	.133	.119
Non-Hispanic Blacks	.233	.229	.132	.142	.137

[a] $\overline{\ln W_w} - \overline{\ln W_h}$ (approx. the percentage difference in the geometric mean observed wage between each group and white non-Hispanic men).

[b] $\overline{\ln W_w} - \overline{\ln W_h} - [(\hat{\sigma}_{12}\hat{\lambda})_w - (\sigma_{12}\hat{\lambda})_h] = \overline{\ln P_w} + \overline{X}_w\beta_w - \overline{\ln P_h} - \overline{X}_h\beta_h$ (the "wage-offer" differential).

[c] $[\overline{X}_w(I - D) + \overline{X}_h D]\ (\beta_w - \beta_h)$.

[d] Assuming whites' wage function reflects no discrimination; $\overline{X}_h\ (\beta_w - \beta_h)$.

[e] Assuming minority group's wage function reflects no discri ination; $\overline{X}_w\ (\beta_w - \beta_h)$.

[f] Assuming that the no-discrimination wage function is halfway between that of whites and minority.

size as the observed wage differential. Selectivity bias is negative for all groups except Central and South Americans, but it is larger in absolute value for white men than for Hispanic men. Therefore it reduces the average observed wage more for white men, narrowing the observed wage differences between them and Hispanics.

The average wages offered to minority men are at least 15% below those offered to white non-Hispanics. How serious a problem is labor-market discrimination in producing these differences? Table 8 shows the wage difference that cannot be explained by various differences in group characteristics (age, education, etc.) and which is therefore potentially due to discrimination. Column 3 in that table shows the estimates if the whites' wage function is assumed to be the no-discrimination one; column 4 gives estimates when the minority group's wage function is used; and the last column shows the average of 3 and 4. In most cases, the three estimates are quite similar. Cuban men constitute the only case in which the choice of weights makes a difference of more than two percentage points in the estimate of the wage difference due to discrimination.

If we take the average estimates of discrimination, given in the last column, the largest (36%) describes the case of Central and South American men. This is 86% of the total wage-offer differential between them and white non-Hispanic men. For Puerto Rican men, discrimination may be responsible for as much as an 18% difference in wages, about half of the 33% wage-offer gap. Discrimination may cause a wage gap of up to 12% for "other Hispanic" men, a little over half of the total gap. Black men are in between the Puerto Ricans and "other Hispanics"; the wage-offer difference due to racial discrimination may be as large as 14%, which is 60% of the total black-white male wage-offer differential.

For Mexican men, however, discrimination may result in only a 6% wage difference at most. The rest of the 34% wage-offer gap is due to differences in characteristics such as education. And Cuban men apparently have higher wages compared to white non-Hispanic men than their human capital characteristics would warrant; the difference in parameters of the wage function goes in their favor.

It is possible that discrimination affecting many Hispanics is directed not against Hispanics per se, but against blacks, immigrants, and those not fluent in English. Since these groups constitute a larger fraction of the Hispanic ethnic groups than of white non-Hispanics, such discrimination would affect Hispanics' wages disproportionately. We include race as a characteristic in our wage equations in order to distinguish discrimination against Hispanics from discrimination against blacks. Language skills and duration of residence in the United States, as aspects of a worker's human capital stock, are also included in the wage equations. Our decomposition method attributes wage differences due to these factors to differences in personal characteristics, not to discrimination. It is therefore of interest to examine how much of the Hispanic-white wage difference is due to the differences in race, nativity, and language skills. Beyond that, analysis of the portion of the Hispanic-white differential that is due to measured characteristics will tell us how much of the difference comes from differences in education levels, geographic location, government-sector employment, health, and age. In Table 9 we present a detailed decomposition of the geometric mean wage differential between each minority group and white non-Hispanics, assuming the no-discrimination parameters lie halfway between those of the whites and those of the minority group.

Table 9

Decomposition of Wage Differences between White Non-Hispanic and Minority Men: Effect of Discrimination and Effect of Particular Variables

	Mexicans	Puerto Ricans	Cubans	Central & South Americans	Other Hispanics	Black Non-Hispanics
Observed arithmetic wage difference:						
$(\overline{W}_w - \overline{W}_h)/\overline{W}_w$	.278	.243	.107	.173	.129	.221
Observed geometric mean wage difference (Table 8, col. 1):						
$\overline{\ln W}_w - \overline{\ln W}_w$	.304	.218	.092	.210	.141	.233
Difference in selection bias:						
$(\sigma_{12}\hat{\lambda})_w - (\sigma_{12}\hat{\lambda})_h$	-.035 (.041)	-.114 (.057)	-.064 (.118)	-.213 (.084)	-.084 (.062)	.004 (.041)
Wage difference, $\overline{\ln W}_w - \overline{\ln W}_h$, corrected for selection bias[a]	.339	.332	.156	.423	.225	.229
Effect of discrimination (Table 8, col. 5):						
$[(\overline{X}_w + \overline{X}_h)/2]\,(\beta_w - \beta_h)$	.064	.177	-.062	.365	.119	.137
Difference of area price levels:						
$\overline{\ln P}_w - \overline{\ln P}_h$	.043	-.099	-.010	-.076	.018	.003
Total effect of background variables listed below:	.233	.253	.228	.134	.089	.088
$(\overline{X}_w - \overline{X}_h)\,(\beta_w + \beta_h)/2$	(.023)	(.044)	(.106)	(.095)	(.015)	(.007)
ED	.171 (.010)	.129 (.018)	.053 (.010)	.034 (.007)	.065 (.008)	.103 (.006)
Total EXP	.011 (.001)	-.027 (.004)	-.062 (.011)	-.039 (.022)	-.008 (.001)	-.015 (.001)
VET	.002 (.004)	-.001 (.008)	.038 (.027)	.042 (.043)	.001 (.002)	.001 (.002)
Total FBORN	.029 (.015)	.101 (.046)	.127 (.113)	.052 (.112)	.005 (.008)	.001 (.003)
ENGNVG	.018 (.025)	.060 (.037)	.060 (.048)	.039 (.046)	.023 (.015)	.001 (.001)
HEALTH	-.0002 (.0003)	.002 (.002)	.003 (.005)	.003 (.006)	.000 (.001)	-.001 (.001)
GOVT	.0002 (.0002)	-.0004 (.001)	-.0001 (.006)	.004 (.005)	-.001 (.002)	-.002 (.001)
NONWHT (β_h)	.002 (.002)	-.010 (.008)	.009 (.010)	-.001 (.018)	.003 (.006)	— —

Note: Standard errors are in parentheses.

[a] $(\overline{X}_w\beta_w + \overline{\ln P}_w) - (\overline{X}_h\beta_h + \overline{\ln P}_h)$ = difference in wage offers. See Table 8, col. 2.

In Table 9 we see that subtracting the area price-level difference from the wage-offer differential of 34% between Mexican and white non-Hispanic men would reduce the "real" wage-offer differential between these groups to 30%. Education is the source of half of the 34% wage-offer differential; bringing the Mexicans up to the whites' average schooling level would bring the Mexican men to within 17% of the whites' average wage rate. This would entail an increase from 9.4 to 12.4 grades completed. The difference in average time in the United States accounts for a wage differential of 3%. Improving fluency in English to the level of white non-Hispanics would eliminate only two percentage points of the gap. Differences in potential work experience, Armed Forces experience, health, government employment, and race each account for a wage differential of 1% or less. Discrimination accounts for a difference of 6%. Race, time in the United States, and English together account for another 5% difference.

The wages offered Puerto Rican men (row 4) are 33% less than those offered white non-Hispanics, on average. The observed wage differential is only two-thirds this size, due to selectivity bias. Adjusting for area prices widens the "real" wage-offer gap to 43%, since Puerto Ricans tend to live in the high-priced Northeastern cities. Differing characteristics account for 60% of this gap, leaving a wage-offer differential of 18% that may be due to discrimination. Just closing the education gap of 2.7 years would eliminate a differential of 13%, and improving Puerto Ricans' command of English would take care of 6%. The Puerto Rican-Anglo difference in length of residence on the U.S. mainland accounts for a 10% wage-offer gap. Race and the difference in potential work experience act

to narrow the observed wage gap, not to widen it. Nothing else has much impact on the wage differential.

Cuban men fall short of the wages offered white non-Hispanic men by 16% after adjusting for selectivity bias (row 4). If their background characteristics were the same, the differential would be 6% in the Cubans' favor. The Cubans' recent arrival in the United States accounts for a differential of 13%. Improving the Cubans' command of English would eliminate a differential of 6%, and closing the education gap of 1.1 grades would eliminate a wage-offer differential of 5%. The Cubans' lack of U.S. Armed Forces experience (which is related to the recency of their immigration) accounts for a 4% differential. The lower wages of black Cubans accounts for a 1% difference in average wages offered Cuban and white non-Hispanic men. The fact that the Cubans are older on average tends to narrow the wage-offer differential; if they had the same potential experience as white non-Hispanics, the wage-offer differential would be 22% instead of 16%.

Central and South American men have average observed wages that are 21% below those of white non-Hispanic men, and their average wage offers are 42% lower than those of the Anglo men. The price-level adjustment widens the "real wage offer" gap to 50%. A differential of only 13% can be explained by differing personal characteristics of the ethnic groups. In this case, a wage-offer differential as high as 36% may be due to discrimination. A 4% difference is due to lack of fluency in English, and a 4% difference results from lack of U.S. Armed Forces experience. Both of these differentials may be linked to the fact that the Central and South Americans are the most recent Hispanic arrivals in the United

States, even more recent than the Cubans, on average. By itself, this accounts for a 5% wage-offer differential. As they already have nearly as much education as white non-Hispanic men (11.8 grades vs. 12.4 grades), increasing education to the level of the Anglos could only close a wage-offer gap of 3%.

The men of "other Hispanic" origin have average wage offers that are 22% below those of white non-Hispanics, after correcting for selectivity bias. A differential of 12% could be attributed to discrimination. A gap of 7% is due to the difference in education of 1.4 grades, and a gap of 2% is due to poor command of English. Local price differences account for another 2%. Nothing else affects the differential in any important way.

By way of comparison, black and white men have a 23% wage-offer difference, of which less than half can be attributed to differing characteristics, so that as much as a 14% wage-offer differential may be due to discrimination. The education difference of nearly two years explains a wage-offer gap of 10%. No other observable differences contribute in a particularly important way to the wage gap.

SUMMARY OF RESULTS

Our major findings, roughly in order of importance, are as follows.

1. The five major Hispanic-American groups differ so much among themselves and from blacks that it makes little sense to lump them under a single "Hispanic" or "minority" rubric for either analysis or policy treatment.

2. Discrimination in the labor market may be responsible for a wage differential from non-Hispanic white men of 18% for Puerto Rican men, 14% for black men, and 12% for "other Hispanic" men, but only 6% for Mexican men. Low levels of education are apparently a much more serious problem than discrimination for Mexicans. The Cuban-Anglo wage differential can be completely explained by differences in observable personal characteristics, especially recency of arrival in the United States and language handicaps. These factors, along with low education and discrimination, also seriously handicap Puerto Rican men.

3. Mexican and "other Hispanic" men, but not the other minority groups, have significantly lower wages in states where Hispanics are a larger fraction of the population. This may be evidence of "crowding" in a discriminatory environment, or of a preference for locating, despite lower earnings, where there are many other Hispanics.

4. Minority men (except for U.S.-born Mexicans) have lower wage returns to education than Anglos, and foreign work experience is worth much less than experience in the United States; indeed, it is virtually worthless for several groups.

5. However, returns to education do not differ significantly between U.S. natives and immigrants within the same ethnic group (except for Mexicans), nor is the difference between foreign and U.S. schooling significant within a group. U.S.-born Mexican men have as high a return to education as U.S.-born Anglos, while the Mexican-born have a much lower return, as do the other minority groups.

6. There is no clear evidence that Hispanic immigrants' wages ever overtake those of native-born members of their ethnic group who are of the same age, educational level, etc.

7. English deficiencies do not depress the wages of Mexican men as much as the other four Hispanic groups.

8. The wages of white and non-white Hispanics do not differ significantly, ceteris paribus.

9. Public-sector wages are not significantly different from private-sector wages of Hispanic and Anglo men with the same human capital characteristics. Black men, however, do get higher wages in government employment.

10. Experience in the Armed Forces does not affect wages in a different way from civilian experience.

11. Health disabilities do not depress wage offers; their often-found negative impact on observed wages is apparently due to sample selection bias.

12. Finally, selectivity bias can be a problem even when estimating wage functions for men, using a sample restricted to wage and salary employees. We find a negative correlation between the error terms in the equations for the wage and for participation in the wage and salary sector. Moreover, sample selection bias affects estimates of intergroup wage differences, making the difference in average observed wages smaller than the true difference in average wage offers.

NOTES

[1]Author's tabulations from the 1976 Survey of Income and Education, as reported in Table 4.

[2]For a description of this data set, see U.S. Bureau of the Census (1978).

[3]Seven Hispanic and seven white non-Hispanic men were excluded from the sample as wage outliers.

[4]We used the Bureau of Labor Statistics index of comparative cost of living based on an intermediate budget for a four-person family in autumn 1975 (U.S. Department of Labor, 1977, p. 277). To the extent possible, we matched the person's SMSA of residence with the same SMSA in the BLS survey. When a sample member lived in an SMSA not included in the BLS survey, we used the cost index for the closest comparable SMSA. When a sample member did not live within any SMSA, we used the "nonmetropolitan" cost index for the region of residence.

[5]To see what the sign of the coefficient of $\hat{\lambda}$ implies, assume a person participates if $W_m > W_r$, where

W_m = market wage offer = $X\beta + \varepsilon_1$, and

W_r = reservation wage = nonmarket productivity = $Y\alpha + \varepsilon_3$.

The participation rule can be expressed as:

participates if $X\beta - Y\alpha + \varepsilon_1 - \varepsilon_3 > 0$, or

participates if $Z\gamma + \varepsilon_2 > 0$, where $\varepsilon_2 = \varepsilon_1 - \varepsilon_3$.

The coefficient of $\hat{\lambda}$ is $\sigma_{12} = \text{Cov}(\varepsilon_1, \varepsilon_2) = \text{Cov}(\varepsilon_1, \varepsilon_1 - \varepsilon_3) = \sigma_{11} - \sigma_{13}$, so $\sigma_{12} \gtrless 0$ as $\sigma_{11} \gtrless \sigma_{13}$. For σ_{12} to be negative, as in our results, the covariance between the errors in the market and reservation wages must be

positive and larger than the variance of the error in the market wage offer.

[6]For immigrants who arrived before 1970, the Survey of Income and Education does not give the exact year of immigration. USEXP and FOREXP are constructed by using the mid-point of the period when the person arrived in the United States as the estimated immigration date. This introduces some measurement error into these variables.

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